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**IN THE CLAIMS:**

**Please amend the claims, as follows:**

1. (Currently amended) An arrayed waveguide grating, comprising:
  - a substrate;
  - a first channel waveguide disposed on the substrate for receiving a multiplexed optical signal;
  - a channel waveguide array disposed on said substrate and constituted such that each length of waveguides is sequentially longer with a predetermined difference between the lengths of the waveguides;
  - a first slab waveguide disposed on said substrate and connecting said first channel waveguide with said channel waveguide array;
  - a second slab waveguide disposed on said substrate and connecting an end of said channel waveguide array on the side wherein said first slab waveguide has not been connected thereto with an end thereof; and
  - a second channel waveguide disposed on said substrate and connected to the other end of said second slab waveguide, wherein a waveguide part in the connected area has a parabolic configuration.

2-3. (Canceled)

4. (Currently amended) An arrayed waveguide grating as claimed in claim 1, wherein a design of said waveguide part parabolic configuration is individually adjusted in response to respective wavelengths of multiplexed optical signals input to said first channel waveguide.

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5-9. (Canceled)

10. (Currently amended) The arrayed waveguide grating of claim 1, wherein said channel waveguide part is formed as a parabolic configuration, ~~wherein said parabolic configuration can be defined by a quadratic function.~~

11. (Currently amended) The arrayed waveguide grating of claim ~~10~~ 1, wherein a width W(z) of the waveguide part having the parabolic configuration, at a location z on a Z axis, is equal to

$$\underline{W(z)} = \{2\alpha\lambda/n_{\text{eff}}(L-Zz) + W_c^2\}^{1/2}$$

wherein  $\alpha$  is a parabolic coefficient,  $\lambda$  is an optical wavelength of an optical transmission signal,  $n_{\text{eff}}$  is an effective index,  $W_c$  is a core width of the second channel optical waveguide, and ~~Z is the width of the parabolic waveguide part at length L is a length of the waveguide part having the parabolic configuration along the Z axis.~~

12. (Previously presented) The arrayed waveguide grating of claim 1, wherein the waveguide part has a core width measuring from approximately one to five times a width of a Gaussian distribution produced in a boundary between the second slab waveguide and the second channel waveguide.

13. (Previously presented) The arrayed waveguide grating of claim 1, wherein said parabolic waveguide part is adjusted to compensate for varying optical transmission widths and insertion loss of said optical transmissions.

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14. (Cancel)

15. (Currently amended) The arrayed waveguide of claim 11, wherein the core width W<sub>p</sub> at the perimeter of each said parabolic waveguide part is formed to have varying widths a different width, as appropriate for varying different wavelengths  $\lambda_i$  of multiplexed optical signals input to said first channel waveguide.

16. (Currently amended) A method for fabricating a device for multiplexing-demultiplexing an optical transmission, said method comprising:

forming a ~~first~~ an input channel waveguide on a substrate, ~~said first channel waveguide serving to serve~~ as an input signal waveguide for a ~~multiplex~~ operation in a ~~multiplex/demultiplex process~~ multiplexed optical signal having optical signals at wavelengths  $\lambda_1$  through  $\lambda_N$ ;

forming a ~~second~~ an output channel waveguide on said substrate, ~~said second channel waveguide serving to serve~~ as an output signal waveguide for ~~said multiplex/demultiplex process~~ separated optical signals of said multiplexed optical signal;

forming a ~~parabolized~~ channel waveguide array on the substrate, wherein each length of the waveguides in the array is sequentially longer;

connecting, with a first slab waveguide, ~~said first~~ input channel waveguide to a first end of said channel waveguide array; and

connecting, with a second slab waveguide, a second end of said channel waveguide array to ~~said second~~ output channel waveguide, wherein an end of each waveguide comprising ~~said second of said~~ of said output channel waveguide that connects to ~~said second slab~~ waveguide

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includes is formed in a parabolic waveguide part shape.

17. (Currently amended) The method of claim 16, wherein said parabolized channel waveguide array comprises an array with a predetermined difference in the lengths of the waveguides and said waveguides have a parabolic-shaped routing.

18. (Currently amended) The method of claim 16, wherein said parabolic waveguide part is formed as an element preadjusted designed to a specific signal wavelength.

19. (Previously presented) The method of claim 16, wherein forming said parabolic waveguide part comprises forming a parabolic width  $W(z)$ , at location z along a Z axis, that equals

$$\underline{W(z) = \{2\alpha\lambda/n_{eff} (L-Z_z) + Wc^2\}^{1/2}}$$

wherein  $\alpha$  is the parabolic coefficient,  $\lambda$  is the optical wavelength of the optical transmission,  $n_{eff}$  is an effective index,  $Wc$  is a core width of an outputting said second channel optical waveguide, and Z is the parabolic width at length L is a length of the waveguide part having the parabolic configuration along the Z axis.

20. (Currently amended) The method of claim 19, wherein the forming the an core opening width comprises forming widths of said waveguide part with said parabolic configuration is from approximately one times to five times a width of a Gaussian distribution produced in a boundary between the second slab waveguide and the second output channel waveguide, said width allowing an amount of light coupled to said second channel waveguide to remain

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substantially constant regardless of a light frequency change condition.

21. (Previously presented) The method of claim 16, further comprising:

adjusting the waveguide part to compensate for varying optical transmission widths and insertion loss of the optical transmissions.

22. (Cancel)

23. (Previously presented) The method of claim 16, wherein a core opening width of each waveguide comprising said second channel waveguide is common with varying wavelengths of multiplexed optical signals input to said first channel waveguide and a width of an opening of said parabolic waveguide part is preset in accordance to a specific wavelength.

24. (Previously presented) An arrayed waveguide grating, comprising:

a substrate;

a first an input channel waveguide disposed on the substrate for receiving a multiplexed optical signal having optical signals at wavelengths  $\lambda_1$  through  $\lambda_N$ ;

a parabolized channel waveguide array, disposed array disposed on said substrate; substrate and comprising a plurality of waveguides of differing lengths, each waveguide in said plurality of waveguides formed in a routing that is shaped to form a parabola;

an output channel waveguide comprising a plurality of optical waveguides for outputting said received multiplexed optical signal as a plurality of separated optical signals at said wavelengths  $\lambda_1$  through  $\lambda_N$ ;

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a first sector form slab waveguide disposed on said substrate and connecting said first input channel waveguide with said parabolized channel waveguide array;

a second sector form slab waveguide disposed on said substrate and connecting an end of said channel waveguide array on the side wherein said first slab waveguide has not been connected thereto with an end thereof with said output channel waveguide,

wherein a waveguide part of each optical waveguide of said output channel waveguide that is connected to said second sector form slab waveguide is shaped in a parabolic configuration.

25. (Previously presented) The arrayed waveguide grating of claim 24, wherein said parabolized channel waveguide array is formed such that each length of said parabolized waveguides is sequentially longer.

26. (Cancel)

27. (Currently amended) The arrayed waveguide grating of claim 26 24, wherein a design of said parabolic configuration of each said waveguide part is preadjusted according to a wavelength.

28. (Currently amended) The arrayed waveguide grating of claim 26 24, wherein said waveguide part parabolic configuration is individually preadjusted according to respective wavelengths of multiplexed optical signals input to said first channel waveguide.

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29. (New) The arrayed waveguide grating of claim 24, wherein:

a waveguide part of said input channel waveguide that connects to said first sector form slab waveguide is shaped in a tapered configuration;

a waveguide part of each waveguide in said channel waveguide that connects to said first sector form slab waveguide is shaped in a tapered configuration; and

a waveguide part of each waveguide in said channel waveguide that connects to said second sector form slab waveguide is shaped in a tapered configuration.

30. (New) The arrayed waveguide grating of claim 11, wherein  $\alpha$  is approximately 1.1.

31. (New) The method of claim 19, wherein  $\alpha$  is approximately 1.1.

32. (New) A multiplexer/demultiplexer apparatus comprising:

a sector form slab waveguide receiving, via a plurality of input ports, a plurality of optical signals separated from a multiplexed optical signal; and

an output channel waveguide comprising a plurality of output optical waveguides for outputting said plurality of separated optical signals, each said output optical waveguide attached to said sector form slab waveguide as an output port by a waveguide portion configured in a parabolic shape.

33. (New) The apparatus of claim 32, wherein said waveguide portion configured in a parabolic shape has a core width measuring from approximately one to five times a width of a Gaussian distribution produced in a boundary between said sector form slab waveguide and

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said output channel waveguide, thereby allowing an amount of light coupled to said output channel waveguide to remain substantially constant regardless of a light frequency change condition.